INCENDIARIES

Advanced Improvised Explosives

SEYMOUR LECKER

Fire has a long history of use by terrorists and saboteurs because of its potential for major destruction from minor effort. Pound for pound, incendiaries can do more damage than explosives, if properly used. Arson has also proven itself as an effective psychological weapon, playing upon man's ancient awe and fear of fire. The time lag between the start of the fire and the destruction of the target can be an advantage in certain operations.

In this third volume of the Advanced Improvised Explosives series, author Seymour Lecker details the use of widely used, relatively inexpensive industrial chemicals that burn with intense heat. Also included is information on oxidizers and ignition devices, safety and health hazards, and a useful glossary of chemical terms.

Warning: Incendiary devices have the potential to be more dangerous for the maker than the intended target, and the use of proper safeguards and restraints is essential. **This manual is presented for information purposes only.**

A Paladin Press Book
ISBN 0-87364-483-2

INCENDIARIES

Advanced Improvised Explosives

SEYMOUR LECKER

PALADIN PRESS
BOULDER, COLORADO

Also by Seymour Lecker:

Deadly Brew: Advanced Improvised Explosives

Improvised Explosives: How to Make Your Own

Shock Sensitive Industrial Materials: Advanced Improvised Explosives

Incendiaries:
Advanced Improvised Explosives
by Seymour Lecker
Copyright © 1988 by Seymour Lecker

ISBN 0-87364-483-2
Printed in the United States of America

Published by Paladin Press, a division of
Paladin Enterprises, Inc., P.O. Box 1307,
Boulder, Colorado 80306, USA.
(303) 443-7250

Direct inquiries and/or orders to the above address.

All rights reserved. Except for use in a review, no portion of this book may be reproduced in any form without the express written permission of the publisher.

Neither the author nor the publisher assumes any responsibility for the use or misuse of information contained in this book.

Illustrations by Bill Border

Contents

Preface ix

Chapter 1 Industrial Chemicals 1

Chapter 2 Oxidizers 35

Chapter 3 Ignition Devices 39

Chapter 4 Labels 45

Appendix A Recommended Reading 49

Appendix B Glossary 51

Warning

This manual is for informational purposes only. Neither the author nor the publisher assumes any responsibility for the use or misuse of information in this book.

"Whoever maliciously damages or destroys or attempts to damage or destroy by means of an explosive or fire any real or personal property...

• Shall be imprisoned for not more than 10 years or fined not more than $10,000 or both.

• If personal injury results, shall be imprisoned for not more than 20 years or fined not more than $20,000 or both.

• If death results, shall be imprisoned for life or shall be subject to the death penalty."

– Federal Law Relating to Explosives

Preface

This volume demonstrates the potential of commonly used industrial chemicals as incendiaries.

Fifty chemicals have been selected having a wide variety of industrial applications, but there are many more. These fifty were selected because they are widely used and have a flash point of under 100° Fahrenheit.

Fire has a long history of use by terrorists and saboteurs because of the potential for major destruction from minor effort. Arson has also proven itself as an effective psychological weapon playing on man's ancient awe and fear of fire.

Once again, it is impossible to overemphasize the potential for danger to persons attempting to use hazardous materials without proper safeguards and restraints.

CHAPTER 1

Industrial Chemicals

ACETALDEHYDE
CH_3CHO

Synonyms

Acetic Aldehyde, Ethanol, Ethanal, Ethyl Aldehyde

Description

Colorless fuming liquid, pungent fruitlike odor.

Uses

Manufacture of acetic acid and numerous other chemicals. Synthetic flavors.

Hazards

Moderately toxic (narcotic). Will cause irritation of eyes, skin, and respiratory tract.

Flash point

-36° F

Fire fighting

CO_2, dry chemical, alcohol foam.

Ignition

Flame or contact with acid anhydrides, alcohols, ketones, phenols, halogens, isocyanates, or strong alkalis.

ACETYL CHLORIDE
CH_3COCl

Synonym
Ethanoyl Chloride

Description
Colorless, fuming liquid. Strong odor.

Uses
Manufacture of dyestuffs and pharmaceuticals.

Hazards
Highly toxic. Can irritate skin, eyes, and mucous membrane. Heat can cause toxic fumes.

Flash point
40° F

Fire fighting
CO_2 or dry chemical.

Ignition
Flame or contact with water or ethanol.

ALLYL AMINE
$C_3H_5NH_2$

Synonym
2-Propenylamine

Description
Colorless to light yellow liquid. Ammonia-like odor.

Uses
Manufacture of pharmaceuticals. Organic synthesis.

Hazards
Highly toxic. Can irritate eyes, skin, and respiratory system. Heat can cause toxic fumes.

Flash point
-20° F

Fire fighting

Alcohol foam, CO_2, dry chemical.

Ignition

Flame.

AMYLENE

$CH_3(CH_2)_2CHCH_2$

Synonyms

Propylethylene, 2-Methyl Butene-2, 1-Pentene

Description

Colorless liquid, highly disagreeable odor.

Uses

Organic synthesis, blending agent for high-octane motor fuels, manufacture of pesticides.

Hazards

Moderately toxic. Narcotic in high concentrations. Can cause asphyxiation. Heat can cause toxic fumes.

Flash point

0° F

Fire fighting

Alcohol foam, water spray or mist, dry chemical.

Ignition

Flame or contact with powerful oxidizers.

BENZOTRIFLUORIDE

$C_6H_5CF_3$

Synonyms

Toluene Trifluoride, Trifluoromethylbenzene

Description

Water-white liquid. Aromatic odor.

Uses

Intermediate for dyes and pharmaceuticals, solvent, dielectric fluid, vulcanizing agent, and insecticide.

Hazards

Highly toxic. Can irritate skin, eyes, and mucous membrane.

Flash point

54° F

Fire fighting

Foam, CO_2, water spray, mist, dry chemical.

Ignition

Flame and contact with oxidizing materials.

TERT - BUTYLAMINE
$(CH_3)_3C{:}NH_2$

Synonyms

2-Aminoisobutane, Trimethyl Aminomethane

Description

Colorless liquid.

Uses

Manufacture of insecticides, fungicides, dyestuffs, and pharmaceuticals. Intermediate for rubber accelerators.

Hazards

Highly toxic. Will irritate skin on contact.

Flash point

50° F

Fire fighting

Alcohol foam.

Ignition

Flame.

TERT - BUTYL HYDROPEROXIDE
$(CH_3)_3COOH$

Synonyms

None

Description

Water-white liquid.

Uses

Polymerization, oxidation, sulfanation catalyst, bleaching, and deodorizing.

Hazards

Highly toxic. Can cause severe depression and incoordination. High concentrations can cause respiratory arrest.

Flash point

80° F

Fire fighting

Alcohol foam, CO_2, dry chemical.

Ignition

Flame or contact with reducing materials.

CHLOROBENZENE
C_6H_5Cl

Synonyms

Chlorobenzol, Monochlorobenzene, Phenyl Chloride

Description

Colorless liquid. Almond-like odor.

Uses

Solvent, pesticide intermediate, heat transfer, manufacture of phenol, chloronitrobenzine, and aniline.

Hazards

Moderately toxic. Narcotic in high concentrations.

Flash point

85° F

Fire fighting

CO_2, dry chemical, water, foam.

Ignition

Flame or contact with oxidizing materials.

COLLODION

$C_{12}H_{16}O_6(NO_3)_4C_{13}H_{17}O_7(NO_3)_3$

Synonyms

None

Description

Pale yellow, syrupy liquid, ethereal odor.

Uses

Cements, coating wounds, solvent for drugs, corn removers, process engraving, lithography, photography.

Hazards

Material is relatively safe, but moderate heat can create large quantities of extremely toxic gases.

Flash point

0° F

Fire fighting

Alcohol foam.

Ignition

Flame.

CYCLOHEXANE

C_6H_{12}

Synonyms

Hexamethylene, Hexanaphthene, Hexahydrobenzene

Description

Colorless liquid. Pungent odor.

Uses

Manufacture of nylon, solvent, extracting essential oils, organic synthesis, recrystallization, paint and varnish remover, fungicide.

Hazards

Moderately toxic. Can irritate skin. Narcotic in high concentrations.

Flash point

-4° F

Fire fighting

Foam, CO_2, dry chemical, spray, fog.

Ignition

Flame or contact with powerful oxidizers.

DIETHYLAMINE

$(C_2H_5)_2NH$

Synonyms

None

Description

Colorless liquid, ammonia-like odor.

Uses

Manufacture of rubber chemicals, textile specialties, solvents, flotation agents, resins, pesticides, polymerization inhibitors, dyes, pharmaceuticals, petroleum chemicals, and corrosion inhibitors. Electroplating.

Hazards

Moderately toxic. Can irritate skin and mucous membrane.

Flash point

-9° F

Fire fighting

Alcohol foam, CO_2, dry chemical.

Ignition

Flame or contact with oxidizing materials.

DIISOPROPYLAMINE
$[(CH_3)_2CH]_2NH$

Synonyms

None

Description

Colorless liquid. Amine-like odor.

Uses

Chemical intermediate catalyst.

Hazards

Moderately toxic. Can irritate skin, eyes, and respiratory tract.

Flash point

30° F

Fire fighting

Alcohol foam, foam, CO_2, dry chemical.

Ignition

Flame or contact with oxidizing materials.

DIMETHYL SULFIDE
$(CH_3)_2S$

Synonyms

Methyl Sulfide, Methyl Thiomethane

Description

Colorless to straw-colored liquid. Disagreeable odor.

Uses

Gas odorant, solvent for many inorganic substances, catalyst impregnator.

Hazards

Moderately toxic. Will irritate eyes. Heat can cause highly toxic fumes.

Flash point

0° F

Fire fighting

Dry chemical, foam, CO_2.

Ignition

Flame and contact with powerful oxidizers.

DIOXOLANE
$C_3H_6O_2$

Synonym

Ethylene Glycol Formal

Description

Water-white liquid.

Uses

Low-boiling solvent and extractant for oils, fats, waxes, dyes, and cellulose derivatives.

Hazards

Moderately toxic. Can irritate skin, eyes, and respiratory tract.

Flash point

35° F

Fire fighting

Alcohol foam, CO_2, dry chemical.

Ignition

Flame or contact with powerful oxidizers.

ETHYLAMINE
$CH_3CH_2NII_2$

Synonyms

Aminoethane, Monoethylamine

Description

Colorless liquid. Strong ammonia odor.

Uses

Dye intermediate, solvent extraction, refining petroleum, stabilizing latex, detergents, organic synthesis.

Hazards

Highly toxic. Will irritate or burn skin, eyes, and respiratory tract.

Flash point

0° F

Fire fighting

Alcohol foam, dry chemical.

Ignition

Flame or contact with oxidizing materials.

ETHYL ETHER
$(C_2H_5)_2O$

Synonyms

Diethyl Ether, Diethyl Oxide, Ether, Ethyl Oxide, Sulfuric Ether

Description

Colorless liquid. Sweet aromatic odor.

Uses

Organic synthesis, analytical chemistry, anesthetic, extractant, manufacture of smokeless powder and industrial solvents.

Hazards

Moderately toxic. Can cause drowsiness, depression, and unconsciousness.

Flash point

-49° F

Fire fighting

Alcohol foam, CO_2, dry chemical.

Ignition

Flame, static electricity, or strong oxidizing materials.

ETHYL MERCAPTAN
C_2H_5SH

Synonyms

Ethanethiol, Ethylhydrosulfide, Ethyl Thioalcohol, Ethylsulfhydrate

Description

Colorless liquid. Odor of skunk.

Uses

Odorant, adhesive, stabilizer, chemical intermediate.

Hazards

Moderately toxic. Odor tends to cling. Heat or contact with water or acid will cause highly toxic fumes.

Flash point

80° F

Fire fighting

CO_2, dry chemical.

Ignition

Flame, spark, or contact with oxidizing materials.

ETHYL NITRATE
$C_2H_5NO_3$

Synonym

Nitric Ether

Description

Colorless liquid, pleasant sweet odor.

Uses

Manufacture of drugs, perfumes, and dyes. Organic synthesis, rocket propellant.

Hazards

Moderately toxic. Can cause dizziness, abdominal cramps, diarrhea, and depression.

Flash point

50° F

Fire fighting

Foam, CO_2, dry chemical.

Ignition

Flame.

ETHYL NITRITE
$C_2H_5NO_2$

Synonyms

Nitrous Ether, Hyponitrous Ether

Description

Colorless or yellowish liquid, ethereal odor.

Uses

Organic reactions, synthetic flavoring.

Hazards

Moderately toxic. Can cause increased pulse rate, decreased blood pressure, and unconsciousness.

Flash point

-31° F

Fire fighting

Foam, CO_2, dry chemical.

Ignition

Flame. Intense light can cause detonation.

FLUOROBENZENE
C_6H_5F

Synonym

Phenyl Fluoride

Description

Colorless liquid. Odor of benzene.

Uses

Insecticide and larvicide intermediate, identification reagent for plastic and resin polymers.

Hazards

Highly toxic. Will irritate skin, eyes, and mucous membrane.

Flash point

5° F

Fire fighting

Water spray, mist, foam, dry chemical, CO_2.

Ignition

Flame or contact with oxidizing materials.

FURAN
C_4H_7O

Synonyms

Furfuran, Furfurane, Oxolc, Tetrol

Description

Colorless to reddish-brown, oily liquid. Almond-like odor.

Uses

Organic synthesis.

Hazards

Moderately toxic. Narcotic. Can cause eye and throat irritation as well as headaches.

Flash point

32° F

Fire fighting

CO_2, dry chemical.

Ignition

Flame or contact with acids or oxidizing materials.

FURFURYLAMINE
$C_4H_3OCH_2NH_2$

Synonym

2-Furanmethylamine

Description

Straw-colored liquid. Faint odor of amine.

Uses

Corrosion inhibitor, soldering flux, chemical intermediate.

Hazards

Moderately toxic. Will irritate skin, eyes, and mucous membrane.

Flash point

99° F

Fire fighting

Foam, CO_2, dry chemical.

Ignition

Flame.

2-HEPTENE
C_7H_{14}

Synonym

2-Heptylene

Description

Colorless liquid.

Uses

Plant growth retardant.

Hazards

Mildly toxic. Can be an irritant and/or asphyxiant.

Flash point

32° F

Fire fighting

Dry chemical, CO_2, foam.

Ignition

Flame or contact with oxidizing materials.

HEXANE

$CH_3(CH_2)_4CH_3$

Synonym

Hexyl Hydride

Description

Colorless liquid. Faint, pleasant odor.

Uses

Solvent for vegetable oils, thermometers (low temperature), polymerization, paint dilutor, and used to denature alcohol.

Hazards

Mildly toxic. Can cause vertigo, drowsiness, loss of appetite, blurred vision, and itching.

Flash point

-7° F

Fire fighting

CO_2, dry chemical.

Ignition

Flame and contact with oxidizing materials.

HYDROCYANIC ACID
HCN

Synonyms

Prussic Acid, Hydrogen Cyanide, Formonitrile

Description

Colorless to white liquid. Faint odor of bitter almonds.

Uses

Manufacture of acrylonitrile, acrylates, adiponitrile, cyanide salts, dyes, chelates, rodenticides, and pesticides.

Hazards

Extremely toxic. Limited exposure will cause dizziness, headaches, and nausea. Continued exposure will quickly result in death.

Flash point

0° F

Fire fighting

CO_2, non-alkaline dry chemical, foam.

Ignition

Flame or contact with acetaldehyde.

ISOPENTANE
$(CH_3)_2CHCH_2CH_3$

Synonyms

2-Methylbutane, Ethydimethylmethane, Isomyl Hydride

Description

Colorless liquid, pleasant odor.

Uses

Solvent, blowing agent for polystyrene, manufacture of chlorinated derivatives.

Hazards

Moderately toxic. Can cause irritation, itching, blisters, and swelling.

Flash point

-60° F

Fire fighting

Foam, CO_2, dry chemical.

Ignition

Flame or contact with oxidizing materials.

ISOPROPYLAMINE

$(CH_3)_2CHNH_2$

Synonym

2-Aminopropane

Description

Colorless liquid, amino odor.

Uses

Solvent, intermediate in synthesis of rubber accelerators, de-hairing agent, manufacture of pharmaceuticals, dyes, insecticides, bactericides, and textiles.

Hazards

Moderately toxic. Will cause irritation. Narcotic in high concentrations.

Flash point

-35° F

Fire fighting

Alcohol foam, foam, CO_2, dry chemical.

Ignition

Flame or contact with oxidizing materials.

ISOPROPYL CHLORIDE
$(CH_3)_2CHCl$

Synonym

2-Chloropropane

Description

Colorless, odorless liquid.

Uses

Solvent, intermediate.

Hazards

Mildly toxic. Can be used as a surgical anesthetic.

Flash point

-26° F

Fire fighting

Dry chemical, CO_2, mist.

Ignition

Flame or contact with oxidizing materials.

METHALLYL CHLORIDE
C_4H_7Cl

Synonyms

Beta-Methylallyl Chloride, Methyl Allyl Chloride, 2-Chlorobutene-2

Description

Colorless to straw-colored liquid. Very sharp odor.

Uses

Manufacture of insecticides, plastics, and pharmaceuticals. Fumigant for grains, tobacco, and soil.

Hazards

Moderately toxic. Can irritate eyes and skin. Heat will produce highly toxic fumes.

Flash point

11° F

Fire fighting

Alcohol foam, CO_2, dry chemical.

Ignition

Flame or contact with oxidizing materials.

METHYL FORMATE
CH_3OCHO

Synonym

Methyl Methanoate

Description

Colorless liquid. Agreeable odor.

Uses

Organic synthesis, cellulose acetate solvent, fumigant, larvicides, food additive.

Hazards

Moderately toxic. Can irritate eyes. Heat can cause toxic gases.

Flash point

-2° F

Fire fighting

Alcohol foam, CO_2, dry chemical.

Ignition

Flame.

2-METHYLFURAN
C_5H_6O

Synonym

Sylvan

Description

Colorless liquid. Ether-like odor.

Uses

Chemical intermediate.

Hazards

Highly toxic. Can irritate eyes, skin, and mucous membrane.

Flash point

-22° F

Fire fighting

CO_2, dry chemical.

Ignition

Flame or contact with oxidizing materials.

NICKEL CARBONYL
$Ni(CO)_4$

Synonym

Nickel Tetracarbonyl

Description

Colorless liquid or needles.

Uses

Production of high-purity nickel powder. Nickel coating of metals.

Hazards

Highly toxic. Can cause headache, dizziness, vomiting, fever, and breathing difficulties. Heat or contact with acids can cause toxic fumes.

Flash point

-4° F

Fire fighting

Water, foam, CO_2, dry chemical.

Ignition

Flame or contact with oxidizing materials.

NONANE
C_9H_{20}

Synonym

Nonyl Hydride

Description

Colorless liquid.

Uses

Organic synthesis, biodegradable detergents, distillation chaser.

Hazards

Mildly toxic. Can irritate respiratory tract. Narcotic in high concentration.

Flash point

88° F

Fire fighting

CO_2, dry chemical.

Ignition

Flame or contact with oxidizing materials.

OCTANE
$CH_3(CH_2)_6CH_3$

Synonyms
None
Description
Colorless liquid.
Uses
Solvent, organic synthesis, calibrations, and azeotropic distillation.
Hazards
Mildly toxic. Can asphyxiate. Narcotic in high concentration.
Flash point
56° F
Fire fighting
Alcohol foam, CO_2, dry chemical.
Ignition
Flame or contact with oxidizing materials.

PROPANAL
C_2H_5CHO

Synonyms
Propionaldehyde, Propyl Aldehyde, Propionic Aldehyde
Description
Colorless to white liquid. Fruity, suffocating odor.
Uses
Manufacture of plastics, synthetic rubber, and prionic acid. Disinfectant, preservatives.

Hazards

Moderately toxic. Will irritate skin, eyes, and mucous membranes.

Flash point

-22° F

Fire fighting

Alcohol foam, CO_2, dry chemical.

Ignition

Flame or contact with oxidizing materials.

PROPIONITRILE
C_2H_5CN

Synonyms

Propionic Nitrile, Propanenitrile, Ethyl Cyanide

Description

Colorless liquid. Ethereal odor.

Uses

Solvent, intermediate and dielectric fluid.

Hazards

Highly toxic. Can cause headaches, visual distortions, fall in blood pressure, vomiting, collapse, and coma. Heat will cause even more toxic fumes.

Flash point

36° F

Fire fighting

Water spray, foam, mist, CO_2, or dry chemical.

Ignition

Flame or contact with oxidizing materials.

PROPYL ACETATE
$C_3H_7OOCCH_3$

Synonym
Propyl Ester

Description
Colorless liquid. Pleasant odor.

Uses
Manufacture of perfumes, flavoring agents, natural and synthetic resins, lacquers, and plastics. Organic synthesis, laboratory reagent, solvent for cellulose derivatives.

Hazards
Mildly toxic. Can cause irritations and retarded breathing.

Flash point
55° F

Fire fighting
Alcohol foam, CO_2, dry chemical.

Ignition
Flame or contact with oxidizing materials.

PROPYLAMINE
$C_3H_7NH_2$

Synonym
1-Amino Propane

Description
Colorless liquid. Strong odor of ammonia.

Uses
Chemical intermediate, laboratory reagent.

Hazards
Mildly toxic. Can irritate or sensitize skin.

Flash point

-35° F

Fire fighting

Alcohol foam, CO_2, dry chemical.

Ignition

Flame or contact with oxidizing materials.

PROPYL FORMATE
$C_3H_7CHO_2$

Synonym

Propyl Methanoate

Description

Colorless liquid. Pleasant odor.

Uses

Food flavoring.

Hazards

Mildly toxic. Can irritate skin and eyes.

Flash point

27° F

Fire fighting

Alcohol foam.

Ignition

Flame or contact with oxidizing materials.

TETRAHYDROFURAN
C_4H_8O

Synonyms

THF, Diethylene Oxide, Tetramethylene Oxide, Cyclotetramethylene Oxide-1, 4 Epoxy Butane

Description

Colorless to white liquid. Ether-like odor.

Uses

Manufacture of resins, vinyls, topcoating solutions, protective coatings, cellophane, adhesives, magnetic tapes, and printing ink. Chemical intermediate and monomer.

Hazards

Moderately toxic. Can irritate eyes and mucous membrane. High concentrations can be narcotic.

Flash point

6° F

Fire fighting

Foam, dry chemical, CO_2.

Ignition

Flame or contact with oxidizers.

THIOPHENE
SCH:CHCH:CH

Synonym

Thiofuran

Description

Colorless liquid.

Uses

Manufacture of dyes and pharmaceuticals, organic synthesis, solvent.

Hazards

Moderately toxic. Will irritate eyes, skin, mucous membrane, and respiratory system.

Flash point

30° F

Fire fighting

Foam, CO_2, dry chemical.

Ignition

Flame or contact with nitric acid.

TRICHLOROSILANE
$HSiCl_3$

Synonym

Silicochloroform

Description

Colorless liquid.

Uses

Purification of silicone.

Hazards

Mildly toxic. Heat can cause toxic fumes. Contact with water or steam can cause toxic and corrosive fumes.

Flash point

7° F

Fire fighting

CO_2, dry chemical.

Ignition

Flame or contact with oxidizing materials.

TRIETHYLAMINE
$(C_2H_5)_3N$

Synonyms
None

Description
Colorless liquid. Odor of ammonia.

Uses
Corrosion inhibitor, propellant, catalytic solvent in chemical synthesis, accelerator activators for rubber, curing and hardening of polymers.

Hazards
Highly toxic. Will irritate all tissue. Can damage kidney and liver.

Flash point
16° F

Fire fighting
CO_2, dry chemical, alcohol foam.

Ignition
Flame or contact with powerful oxidizing materials.

TRIMETHYL CHLOROSILANE
$(CH_3)_3SiCl$

Synonyms
None

Description
Colorless liquid.

Uses
Intermediate for silicone fluids.

Hazards
Moderately toxic. Will irritate tissue.

Flash point

-18° F

Fire fighting

Foam, alcohol foam or fog.

Ignition

Flame or contact with water.

VINYL BUTYL ETHER
$CH_2{:}CHOC_4H_9$

Synonyms

Butyl Vinyl Ether, Vinyl-N-Butyl Ether, N-Butyl Vinyl Ether

Description

Colorless liquid.

Uses

Copolymerization, synthesis.

Hazards

Mildly toxic. Can cause loss of appetite, thirst, and fatigue.

Flash point

15° F

Fire fighting

Foam, CO_2, dry chemical.

Ignition

Flame or contact with powerful oxidizers.

VINYLCYCLOHEXENE
C_8H_{12}

Synonyms

1-Vinylcyclohexene-3, 4-Vinylcyclohexene-1, Cyclohexenylethylene

Description

Colorless liquid.

Uses

Polymers, organic synthesis.

Hazards

Mildly toxic. Can irritate tissue. Narcotic in high concentrations.

Flash point

61° F

Fire fighting

Foam, CO_2, dry chemical.

Ignition

Flame or contact with oxidizing materials.

VINYL ISOBUTYL ETHER
$C_4H_9OCHCH_2$

Synonyms

Isobutyl Vinyl Ether, Ive

Description

Colorless liquid.

Uses

Manufacture of surgical adhesives, lacquers, resins, and plastics. Chemical intermediate.

Hazards

Mildly toxic. Can cause loss of appetite, thirst, and fatigue.

Flash point

15° F

Fire fighting

Alcohol foam, CO_2, dry chemical.

Ignition

Flame or contact with oxidizing materials.

VINYL METHYL KETONE
$CH_3COCH{:}CH_2$

Synonyms

3-Butene-2-One, Methyl Vinyl Ketone

Description

Colorless liquid. Irritating odor.

Uses

Synthesis and alkylating agent, intermediate in the manufacture of steroids and vitamins, monomer for vinyl resins.

Hazards

Moderately toxic. Can irritate skin, eyes, and mucous membrane. Heat can create toxic fumes.

Flash point

20° F

Fire fighting

CO_2, dry chemical.

Ignition

Flame or contact with oxidizing materials.

VINYL PROPIONATE
$CH_2:CHOCOC_2H_5$

Synonyms
None

Description
Colorless liquid.

Uses
Manufacture of emulsion paints.

Hazards
Mildly toxic. Can cause loss of appetite, thirst, and fatigue.

Flash point
34° F

Fire fighting
Alcohol foam.

Ignition
Flame or contact with oxidizing materials.

XYLENE
$C_6H_4(CH_3)_2$

Synonyms
Dimethyl Benzene, Xylol

Description
Colorless liquid.

Uses
Solvent, insecticides, synthesis of organic chemicals. Manufacture of protective coatings, enamels, rubber cements, dyes, motor fuels, pharmaceuticals, and vitamins.

Hazards

Moderately toxic. Can irritate skin, eyes, and mucous membrane.

Flash point

81° F

Fire fighting

Foam, CO_2, dry chemical.

Ignition

Flame or contact with powerful oxidizers.

CHAPTER 2

Oxidizers

Many of the materials outlined in Chapter 1 will ignite upon contact with oxidizers. Many of the most readily available oxidizers have already been described in previous volumes in this series: **Deadly Brew: Advanced Improvised Explosives** (Vol. I) and **Shock Sensitive Industrial Materials: Advanced Improvised Explosives** (Vol. II). They are listed below.

ACETYL BENZOYL PEROXIDE $C_6H_5CO\text{-}O_2\text{-}OCCH_3$	VOL II
ACETYL PEROXIDE $(CH_3CO)_2O_2$	VOL II
ALUMINUM CHLORATE $AL(ClO_3)_3$	VOL II
AMMONIUM NITRITE NH_4NO_2	VOL II
BARIUM CHLORATE $Ba(ClO_3)_2\text{-}H_2O$	VOL II

BENZOYL PEROXIDE $C_{14}H_{10}O_4$	VOL I
CADMIUM NITRATE $Cd(NO_3)_2$	VOL II
CALCIUM NITRATE $Ca(NO_3)_2$	VOL II
CERIUM NITRATE $Ce(NO_3)$	VOL II
CHLORINE HEPTAOXIDE Cl_2O_7	VOL II
p-CHLOROBENZOYL PEROXIDE $(ClC_6H_4CO)_2O_2$	VOL II
CHROMIUM NITRATE $Cr(NO_3)_3$	VOL II
FLUORINE NITRATE FNO_3	VOL II
HYDROGEN PEROXIDE H_2O_2	VOL I
LAUROYL PEROXIDE $C_{24}H_{46}O_4$	VOL II
LITHIUM CHLORATE $LiClO_3$	VOL II

LITHIUM NITRATE VOL II
$LiNO_3$

NITRIC ACID VOL I
HNO_3

OZONE VOL II
O_3

PERCHLORIC ACID VOL II
$HClO_4$

POTASSIUM NITRATE VOL II
KNO_3

POTASSIUM NITRITE VOL II
KNO_2

SILVER PERMANGANATE VOL I
$AgMnO_4$

SODIUM CHLORITE VOL II
$NaClO_2$

SODIUM NITRATE VOL II
$NaNO_3$

STRONTIUM NITRATE VOL II
$Sr(NO_3)_2$

STRONTIUM PEROXIDE VOL II
SrO_2

SULFURIC ACID H_2SO_4	VOL I
THALLIUM NITRATE $TlNO_3$	VOL II
THORIUM NITRATE $Th(NO_3)_2$	VOL II
ZINC NITRATE $Zn(NO_3)_2$	VOL II
ZIRCONIUM NITRATE $Zr(NO_3)_2$	VOL II

CHAPTER 3

Ignition Devices

FLAME IGNITER

1. Coat a photographer's flashbulb with epoxy glue and powdered matchheads.

2. Attach a telescoping antenna to the flashbulb.

3. Attach electrical wires to the side and base of the flashbulb. Note: Wires must be long enough to allow the complete extension of the antenna.

4. Attach the antenna to any convenient electrical firing assembly.

5. Wire the flashbulb into the electrical firing assembly.

6. Pour the incendiary liquid on the floor.

7. Place the igniter in the center of the room.

8. Extend the antenna so that the flash will occur well up into the vapor.

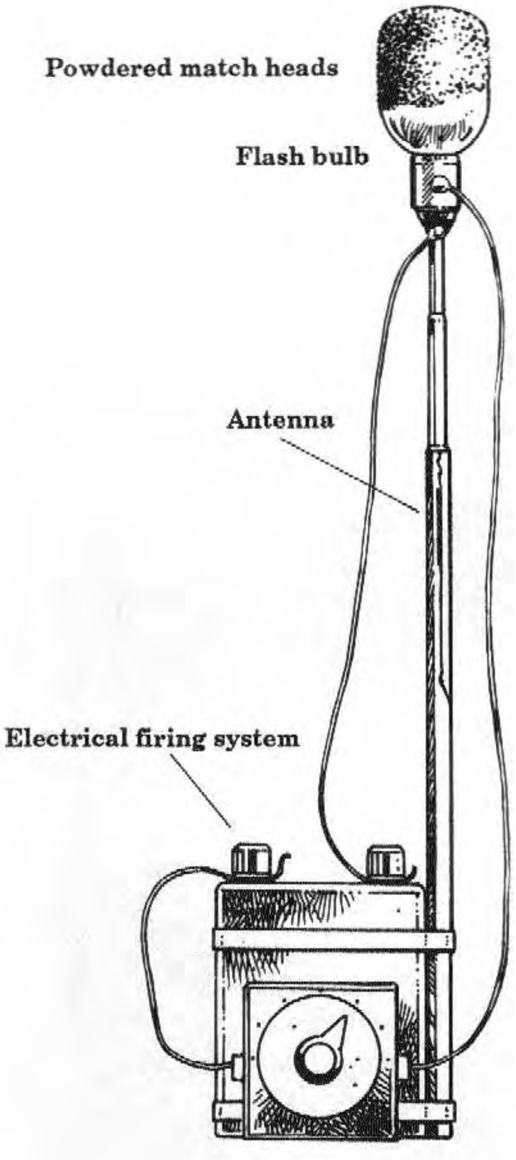

Figure 1. Flame Igniter

OXIDIZER IGNITER

1. Fill a bottle with any convenient oxidizing material.

2. Attach an electrical blasting cap and any convenient electrical firing system to the bottle.

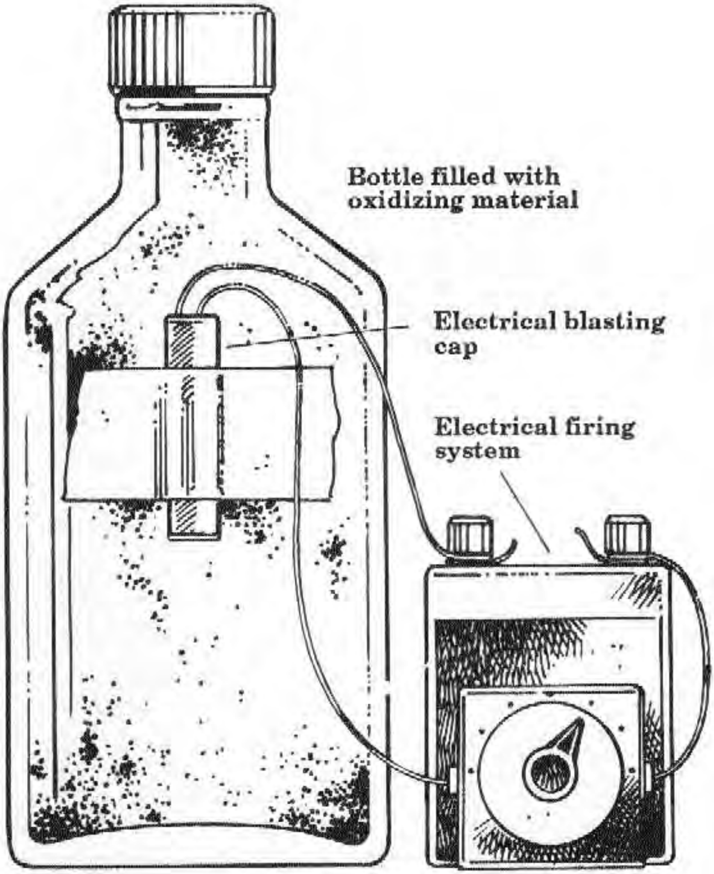

Figure 2. Oxidizer Igniter

3. Pour the incendiary liquid on the floor.

4. Place the igniter in the center of the room.

Make certain that the exterior of the bottle is completely free of oxidizing material.

MOLOTOV COCKTAIL - BOOBY TRAP

1. A mixture of 50% potassium chlorate and 50% powdered sugar is added to warm water to saturation.

2. Soak a clean cotton rag in the mixture, then allow it to dry, leaving the chlorate/sugar absorbed in the rag.

3. Fill a bottle 3/4 full of a mixture comprised of 1/4 sulfuric acid and 3/4 gasoline.

4. Conceal a zinc washer in the cap of the bottle.

5. Put the components together as an ordinary Molotov cocktail. (See Figure 3.)

Leave this device in an obvious location. When the person who finds it attempts to move it, the liquid in the bottle will come into contact with the zinc in the cap and produce hydrogen gas. The pressure will eventually shatter the bottle. The chlorate/sugar will come into contact with the sulfuric acid and ignition will occur.

The safest way to transport this device is to seal it with an ordinary cap. Remove this cap and install the zinc-treated cap when the bottle is in place.

This device—like all booby traps—has the potential to be more dangerous for its maker than its intended target.

Rag is never stuffed into the bottle's opening. This can cause premature ignition or spill flaming liquid on the thrower.

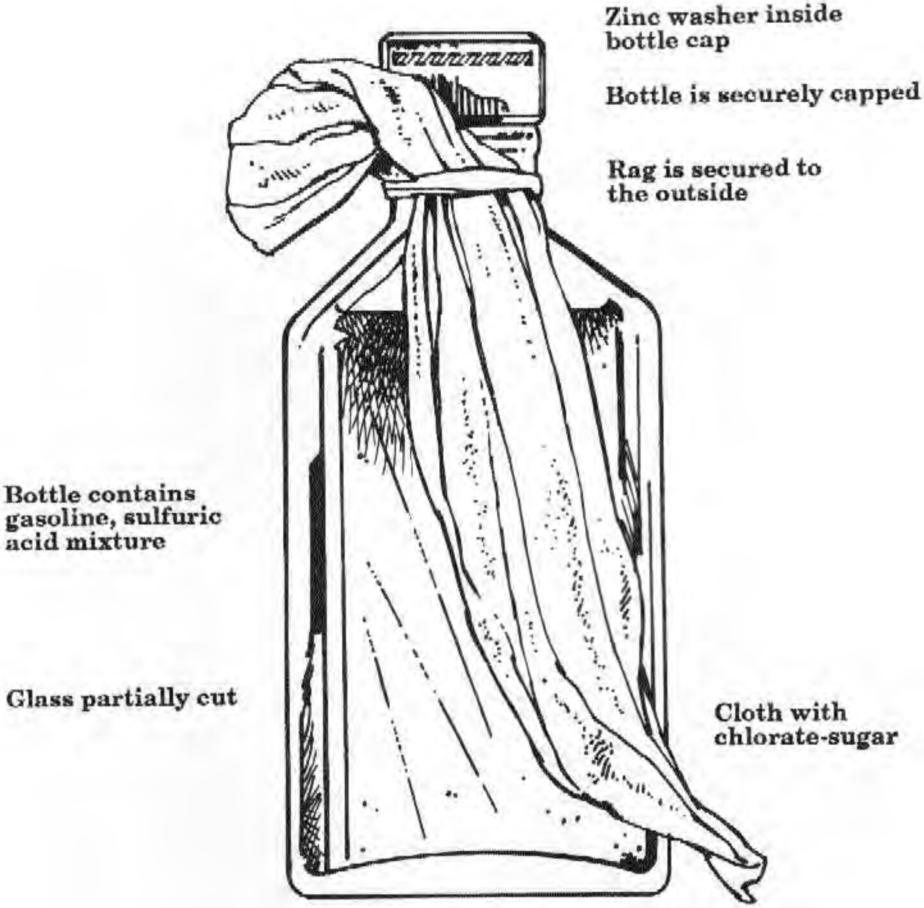

Figure 3. Molotov Cocktail Booby Trap

CHAPTER 4

Labels

To facilitate the safer handling of industrial materials, a system of labels has been devised. The labels are diamond-shaped and divided into four compartments. (See Figure 4.)

The system identifies the hazards of materials in the areas of Health, Flammability, and Reactivity. These categories are rated as follows:

HEALTH
Left Side—Blue

4 Materials which on very short exposure could cause death or major residual injury even if prompt medical treatment were given.

3 Materials which on short exposure could cause serious temporary or residual injury even if prompt medical treatment were given.

2 Materials which on intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical treatment is given.

1 Materials which on exposure would cause irritation but only minor residual injury even if no treatment were given.

0 Materials which offer no particular hazard.

Figure 4. Hazardous Material Label

FLAMMABILITY

Top–Red

4 Materials which will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature, or which are readily dispersed in air and which will burn readily.

3 Liquids and solids that can be ignited under almost all ambient temperature conditions.

2 Materials that must be moderately heated or exposed to relatively high ambient temperature before ignition can occur.

1 Materials that must be preheated before ignition can occur.

0 Materials that will not burn.

REACTIVITY
Right Side—Yellow

4 Materials which in themselves are readily capable of detonation or of explosive decomposition or reaction at normal temperatures and pressures.

3 Materials which in themselves are readily capable of detonation or explosive reaction but require a strong initiating source or which must be heated under confinement before initiation or which react explosively with water.

2 Materials which in themselves are normally unstable and readily undergo violent chemical change but do not detonate. Also materials which may react violently with water or which may form potentially explosive mixtures with water.

1 Materials which in themselves are normally stable, but which can become unstable at elevated temperatures and pressures or which may react with water with some release of energy but not violently.

0 Materials which are normally stable.

The fourth (lower) part of the label is used to indicate unusual reactivity with water. This reactivity is indicated by the letter "W" with a line through it. This space may also be used to indicate radioactivity.

APPENDIX A

Recommended Reading

USMC Destruction by Demolition, Incendiaries and Sabotage
Paladin Press

Improvised Munitions Black Book, Vols. 1 and 2
Paladin Press

Fire Protection Guide on Hazardous Materials
National Fire Protection Association

Hazardous Chemicals Data
National Fire Protection Association

The Science of Industrial Explosives
M.A. Cook
Reinhold Publishing

Industrial Explosives in America
J. Dannenberg
ABA Publishing

Condensed Chemical Dictionary
G.G. Hawley
Van Nostrand Reinhold

Deadly Brew: Advanced Improvised Explosives
Seymour Lecker
Paladin Press

Shock Sensitive Industrial Materials: Advanced Improvised Explosives.
Seymour Lecker
Paladin Press

Fire and Explosion Risks
E. Von Schwarts
Griffen and Company

TM 31-201-1
Department of the Army Technical Manual
Unconventional Warfare Devices and Techniques—Incendiaries

TM 3-336
Department of the Army Technical Manual
Flame Fuels

FM 3-21
Department of the Army Field Manual
Chemical Accident Contamination Control

APPENDIX B

Glossary

Accelerator

A compound that reduces the time for vulcanization of rubbers or increases the activity of photographic developer.

Alkali

Any substance which in water solution is caustic to the skin.

Antioxidant

An organic compound added to rubber, natural fats and oils, food products, gasoline, and lubricating oils to retard oxidation, deteriorization, and gum formation.

Azeotrope

A liquid mixture of two or more substances which behaves like a single substance in that its vapor has the same composition as the liquid.

Base

A compound that can neutralize an acid to form salts.

Catalyst

Any substance of which a fractional percentage affects the rate of a chemical reaction without itself being

consumed or undergoing a chemical change.

Deliquescent

Tends to absorb water vapor and become liquid.

Demulsification

The process of destroying an unwanted emulsion.

Denature

To change the molecular structure of globular proteins by bringing a protein solution to its boiling point and exposing it to acids or alkalies or various detergents. The process reduces the solubility of proteins and prevents crystallization.

Electroplating

The deposition of a thin layer of metal on an object by passing an electric current through an aqueous solution of salt containing ions of the element being deposited.

Emulsion

Suspension of an oil or resin in an aqueous liquid, or of an aqueous liquid in an oil.

Epoxy

An organic compound. A resin.

Ester

An organic compound corresponding in structure to a salt in inorganic chemistry.

Ether

A class of organic compounds containing an oxygen atom between two carbon atoms.

Flash point

The temperature at which a liquid or volatile solid gives off vapor sufficient to form an ignitable mixture with the air near its surface.

Hydrocarbon

An organic compound consisting exclusively of the elements carbon and hydrogen.

Hydrolysis

A chemical reaction in which water reacts with another substance to form two or more new substances.

Initiator

A substance that is similar to a catalyst, except that it is consumed in the reaction.

Intermediate

An organic compound. Chemical stepping-stones between a parent substance and the final product.

Leveling agent

A substance which aids in the uniform dispersion of a coating such as paint.

Mordant

A substance capable of binding a dye to a textile fiber.

Organic chemistry

A branch of chemistry which embraces the majority of compounds of carbon.

Oxidizer

Any compound that spontaneously evolves oxygen at or near room temperature.

Plasticizer

An organic compound added to a polymer both to facilitate processing and increase the flexibility and toughness of the final product.

Polymer

A macromolecule formed by the chemical union of five or more identical combining units called monomers.

Reagent

Any substance used in a reaction for the purpose of detecting, measuring, examining, or analyzing other substances.

Reducing agent

The opposite of an oxidizer; removes oxygen from a compound.

Salt

The compound formed when the hydrogen of an acid is replaced by a metal or its equivalent. The reaction of an acid and a base yields a salt and water.

Solvent

A substance capable of dissolving another substance to form a uniformly dispersed mixture.

Viscosity

The internal resistance to flow exhibited by a fluid.

Vulcanize

To harden and make rubber more durable by chemical means; usually by combining it with sulfur.